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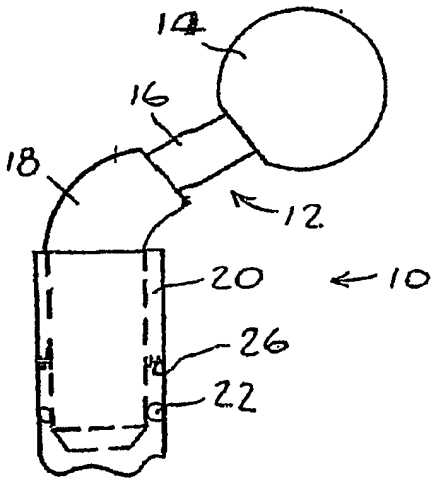
(54) Title: ROTATABLE HEAD OF ENARTHROTIC PROSTHESIS



(57) Abstract: An enarthrotic prosthesis (10) characterized by a head member (12) including an at least partially spherical ball (14) extending from a base member (18), the base member (18) rotatingly seated in a stem member (20), wherein the head member (12) is rotatable with respect to the stem member (20) even after installation in a patient.

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ROTATABLE HEAD OF ENARTHROTIC PROSTHESIS

FIELD OF THE INVENTION

The present invention relates generally to surgical prostheses, and particularly to prostheses for an enarthrosis, such as a femoral prosthesis for use in total hip replacements, hemiarthroplasty and the like.

BACKGROUND OF THE INVENTION

Hip replacements are a common orthopedic surgical procedure and are usually necessitated by degenerative disease of the hip joint, hip trauma or disease of the hip creating later hip trauma. In a total hip replacement, the surgical procedure may involve reaming of the acetabulum, reaming of the proximal medullary cavity of the femur and inserting a prosthesis into the medullary cavity to replace the natural femoral head. The head of the prosthesis (usually formed by a detachable ceramic ball) mates with the acetabulum in the same manner that the natural femoral head mates with the acetabulum in a normal hip joint. Not all cases require a complete hip replacement. In hemiarthroplasty, only the femoral head requires replacement, such as, for example, in repairing a fractured neck of the femur.

There are many hip prostheses that have been used to replace the femoral head. One generally known and widely used prosthesis typically comprises an arcuate distal shaft having a gradual taper along its full length and terminating proximally in a neck which mates with the head of the prosthesis via a Morse taper. The shaft is inserted into the intramedullary cavity of the femur.

It is important to achieve proper alignment or anteversion (tilting) between the prosthesis head and the acetabulum. This requires considerable skill on the part of the surgeon with very little margin for error.

Femoral prostheses have been developed which allow adjusting the angular relationship between the femoral head and the intramedullary shaft of the prosthesis, in an effort to achieve proper alignment or anteversion of the femoral head of the prosthesis and the acetabulum. Examples of such prostheses are described in US Patent 5,580,352 to Sekel. Examples of commercially available femoral prostheses include the MARGRON brand of femoral prostheses from Portland Orthopedics Inc. These prostheses have a femoral head that may be rotated with respect to the intramedullary shaft of the prosthesis. Once the head has been properly aligned with the intramedullary shaft, the head is tightly secured in place, typically with a screw, prior to final placement in the patient.

SUMMARY OF THE INVENTION

The present invention seeks to provide an improved prostheses for an enarthrosis, such as a femoral prosthesis for use in total hip replacements, hemiarthroplasty and the like, as is described in detail further hereinbelow. The invention is described hereinbelow for a femoral prosthesis, but it is understood that the invention is not limited to a hip joint and may be carried out on any kind of enarthrosis (ball-and-socket joint).

Unlike the prior art, the femoral prosthesis has a femoral head that may be rotated with respect to the intramedullary shaft of the prosthesis even after final placement in the patient. In the prior art, some femoral prostheses have been prone to unwanted reverse rotational withdrawal from the femoral medullary cavity. In some cases, a rotational failure of the prosthesis can be generated when a patient moves from a sitting to a standing position. Other disruptions in the anteversion between the femoral head and the acetabulum can occur.

It has surprisingly been found that permitting rotation of the femoral head with the respect to the shaft may actually help prevent the above problems and result in a much more stable joint.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be understood and appreciated more fully from the following detailed description taken in conjunction with the drawings in which:

Figs. 1 and 2 are simplified illustrations of an enarthrotic prosthesis, constructed and operative in accordance with an embodiment of the present invention, with a head member in different angular orientations with a respect to a stem member; and

Fig. 3 is a simplified, partially sectional illustration of the enarthrotic prosthesis of Fig. 1.

DETAILED DESCRIPTION OF EMBODIMENTS

Reference is now made to Figs. 1 and 2, which illustrate an enarthrotic prosthesis 10, constructed and operative in accordance with an embodiment of the present invention. As mentioned before, the description follows for a femoral prosthesis 10, but it is understood that the invention is not limited to a hip joint and may be carried out on any kind of enarthrosis.

The femoral prosthesis 10 may include a head member 12 comprising an at least partially spherical ball 14 mounted on a post 16 extending from a base member 18. The base member 18 is rotatingly seated in a stem member 20, which may include an intramedullary shaft adapted to be placed in an intramedullary cavity (of the femur, for

example). The femoral prosthesis 10 may be constructed of any suitable material for bone or joint prostheses, such as but not limited to, titanium, chrome cobalt and the like. Ball 14 may be constructed, without limitation, of similar materials or ceramic, for example. The femoral prosthesis 10 may be coated with a material that enhances adhesion with bone, such as but not limited to, hydroxyapatite.

The bearing surfaces between the base member 18 and stem member 20 may be finished with a surface finish that promotes rotational freedom between the parts. Additionally or alternatively, bearing elements 22 may be placed at an interface between the base member 18 and stem member 20, such as but not limited to, ball bearings, roller elements and the like. In such an arrangement, the head member 12 may rotate through any angular range with respect to the stem member 20, as indicated by arrow 24 in Fig. 2.

In accordance with a non-limiting embodiment of the present invention, the rotation of head member 12 with respect to stem member 20 may be controlled or limited by a biasing device 26 (Fig. 3), such as but not limited to, coil springs, leaf springs, elastomeric bands or rings, and the like, placed between the base member 18 and stem member 20.

In the illustrated embodiment, femoral prosthesis 10 is shown installed in a femur. As is well known in the art, the installation may include first performing neck resection, followed by reaming, milling and tapping of the femur, after which the stem member 20 is screwed or otherwise installed in the intramedullary cavity of the femur. The head member 12 is then installed in the stem member 20.

It is appreciated that various features of the invention which are, for clarity, described in the contexts of separate embodiments, may also be provided in combination in a single embodiment. Conversely, various features of the invention which are, for brevity, described in the context of a single embodiment, may also be provided separately or in any suitable subcombination.

CLAIMS

What is claimed is:

1. An enarthrotic prosthesis (10) characterized by:

a head member (12) comprising an at least partially spherical ball (14) extending from a base member (18), said base member (18) rotatingly seated in a stem member (20), wherein said head member (12) is rotatable with respect to said stem member (20) even after installation in a patient.

2. The enarthrotic prosthesis (10) according to claim 1, wherein said head member (12) rotates with respect to said stem member (20) after installation in a patient.

3. The enarthrotic prosthesis (10) according to claim 1, wherein bearing surfaces between said base member (18) and said stem member (20) are finished with a surface finish that promotes rotational freedom therebetween.

4. The enarthrotic prosthesis (10) according to claim 1, further comprising bearing elements (22) placed at an interface between said base member (18) and said stem member (20).

5. The enarthrotic prosthesis (10) according to claim 1, wherein rotation of said head member (12) with respect to said stem member (20) is controlled by a biasing device (26) placed between said base member (18) and said stem member (20).

6. The enarthrotic prosthesis (10) according to claim 1, wherein said stem member (20) comprises an intramedullary shaft adapted to be placed in an intramedullary cavity.

7. The enarthrotic prosthesis (10) according to claim 1, wherein said at least partially spherical ball (14) is mounted on a post (16) extending from said base member (18).

8. The enarthrotic prosthesis (10) according to claim 1, wherein said prosthesis (10) is coated with a material that enhances adhesion with bone.

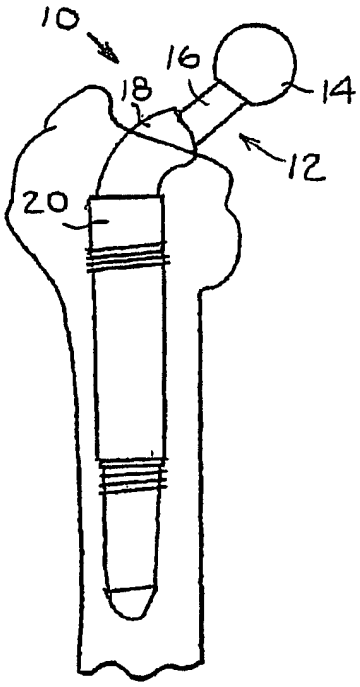

FIG. 1

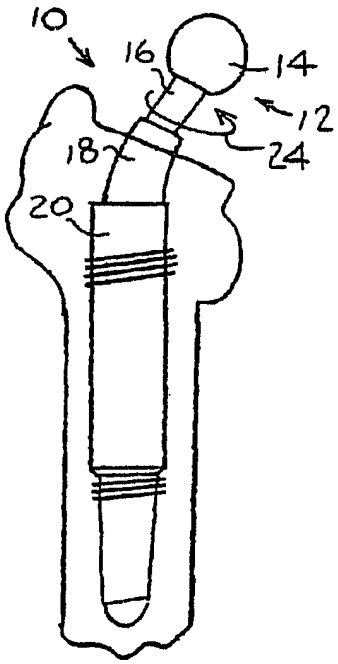

FIG. 2

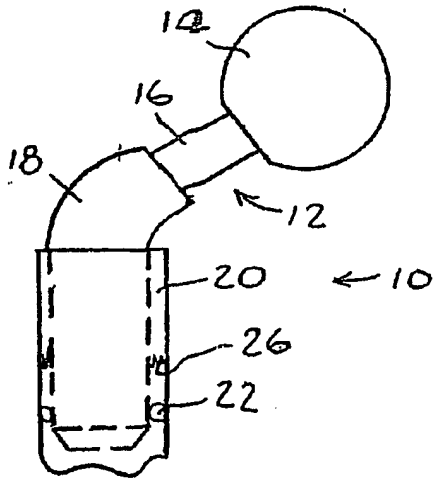

FIG. 3